

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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In the Matter of: )  
 )  
Revision of the Commission's )  
Rules To Ensure Compatibility )  
With Enhanced 911 Emergency )  
Calling Systems )

CC Docket No. 94-102

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FEDERAL COMMUNICATIONS COMMISSION  
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COMMENTS OF  
THE PERSONAL COMMUNICATIONS INDUSTRY ASSOCIATION

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## SUMMARY

PCIA fully shares the Commission's important objective of maximizing compatibility between wireless services and Enhanced 911 (E911) systems. Specifically, it concurs that subscribers to real-time voice services interconnected with the public switched telephone network ultimately should enjoy the same access to advanced emergency response services as wireline service subscribers, with due consideration for the unique characteristics of radio-based technology. At the same time, however, PCIA strongly disagrees with the approach toward achievement of the compatibility objective that is set forth in the Notice. In PCIA's view, the Notice rests on two faulty assumptions: first, that full-scale regulatory intervention is necessary at this time, and second, that the profound technical issues raised by compatibility may be resolved through imposition of arbitrary deadlines.

PCIA has worked closely with members of the public safety and emergency response communities to identify and prioritize the functional components of wireless/E911 compatibility, articulate an evolutionary approach to compatibility that assures close coordination between wireless service providers, local exchange carriers, and Public Safety Answering Point (PSAP) operators, and catalog candidate location technologies. These achievements are documented in a Wireless 911 JEM (Joint Expert Meeting)

Report, which was published shortly after release of the Notice. The Wireless 911 JEM Report confirms the good faith efforts of the wireless industry to work toward compatibility and highlights the imprudence of setting arbitrary and unachievable performance deadlines.

As the Wireless 911 JEM Report makes clear, the technical obstacles to compatibility are both steep and not susceptible to solution by regulatory fiat. The evolutionary paths set out in that Report represent the consensus recommendation of all affected interests and establish a blueprint for continued, diligent efforts to expedite compatibility. Consequently, PCIA recommends that the Commission reconsider the mandatory milestones proposed in the Notice, and instead instruct industry bodies to continue to work toward compatibility in accordance with the JEM approach.

The process of developing the technical underpinnings for wireless service/E911 compatibility has four steps:

- First, affected interests must draft a Standards Requirements Document ("SRD") to define the capabilities required of the wireless and landline telephone systems and the PSAP. The PCIA/JEM Report goes a long way toward establishing a workable SRD.
- Second, the industry must translate these performance requirements into hardware design and data transfer standards.
- Third, manufacturers must build prototype equipment which must be field-tested across each of the frequency bands, air interfaces, and system architectures used in providing wireless services.

- Fourth, equipment must be deployed commercially.

For some of the elements of compatibility, such as the provision of call-back capabilities, these steps likely can be concluded in the relatively near future. Others, such as ALI technology, will take considerably longer -- with full deployment likely occurring between 2000 and 2002. In no case, however, can the Commission or the industry establish today a deadline that is anything more than arbitrary. Accordingly, the most appropriate role for the Commission with respect to technical developments would be informally to monitor industry meetings and, if desired, require submission of periodic progress reports.

In contrast to the technological issues raised by compatibility, where the Commission should tread lightly, firm guidance is warranted with respect to several important policy issues. First, the Commission should refrain from establishing specific privacy protection requirements for the delivery of 911 calls and should immunize wireless service providers from liability for transmitting information that is required to be provided under the FCC's rules or standard industry practices. Second, the Commission should preempt state imposition of wireless service/E911 requirements in order to assure nationwide compatibility of E911 access technologies. Third, the Commission should grant wireless carriers the same liability protection as wireline carriers enjoy in the provision of access to 911 services by adopting

language developed and discussed at the Wireless 911 JEM. Fourth, the Commission should initiate a proceeding to develop a rational and equitable system through which wireless service providers can recover the substantial costs that will be engendered by development and deployment of the technology needed to support compatibility.

PCIA is confident that the wireless service industry, working together with manufacturers and the emergency response community, will progress toward compatibility as expeditiously as possible. Commission action consistent with the recommendations summarized above and discussed in detail herein will help assure that the fundamental objective of compatibility is achieved in a timely, efficient, and cost-effective manner.

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COMMENTS OF  
THE PERSONAL COMMUNICATIONS INDUSTRY ASSOCIATION

The Personal Communications Industry Association ("PCIA") respectfully submits its comments regarding the Commission's Notice of Proposed Rulemaking regarding compatibility between wireless services and E911 systems.<sup>1</sup> PCIA strongly endorses the Commission's ultimate goal of assuring wireless/E911 compatibility. Nonetheless, for the reasons discussed herein, PCIA respectfully submits that the approach in the Notice -- setting arbitrary deadlines for compliance without acknowledging the major hurdles that must be overcome -- is both unrealistic and counter-productive. Instead, the Commission should adopt policy directives and encourage industry groups to continue their diligent efforts to develop standards and technology for compatibility.

I. INTRODUCTION

As the national trade association for the personal communications services industry, PCIA has actively sought to

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<sup>1</sup> FCC 94-237 (released October 19, 1994) ("Notice").

promote compatibility between wireless services and enhanced 911 systems. To this end, PCIA has collaborated closely with the National Emergency Number Association ("NENA"), the Association of Public Safety Communications Officials ("APCO"), the National Association of State 911 Administrators ("NASNA"), Committee T1 Telecommunications, and the Telecommunications Industry Association ("TIA"), in the context of a Joint Experts Meeting, to produce a report entitled "Wireless Support of 9-1-1 and Enhanced 9-1-1 Emergency Services" ("JEM Report").<sup>2</sup> That report prioritizes PSAP service requirements, maps these features to four evolutionary paths (based on the degree of modification needed to existing systems), explains the information elements needed between the wireless systems and the emergency services system to support the PSAP service requirements, and identifies radio location techniques that may eventually provide more accurate mobile station location information.

PCIA realizes that the JEM Report was released after the Commission issued the Notice in this proceeding. Nonetheless, that Report calls into question the fundamental premise of the Notice -- that Commission-established, arbitrary deadlines for various elements of compatibility are

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<sup>2</sup> This JEM Report "adapt[ed] and expand[ed]" the earlier TIA TR45 Emergency Services JEM Report (approved on August 24, 1994). JEM Report, Executive Summary, at 1.



either achievable or in the public interest.<sup>3</sup> In fact, the Report explicitly states that "[t]he public safety and wireless service provider communities each have a unique set of challenges that includes economic, operational and technological feasibility," and that "mandat[ing] a single solution would be extremely difficult and premature."<sup>4</sup> Consequently, the JEM -- which represents a consensus between the public safety community and the wireless industry -- recommended an "evolutionary path" to compatibility.<sup>5</sup>

Because the hurdles to compatibility are both steep and not susceptible to solution by regulatory fiat, PCIA urges the Commission to reconsider the mandatory milestone approach set forth in the Notice. In its place, the Commission should endorse the efforts and approach of the JEM and instruct industry bodies to continue to work toward compatibility. The process of developing the technical capabilities to support compatibility has four steps:

- First, affected interests must draft a Standards Requirements Document ("SRD"), which will define the capabilities required of the wireless system, the landline telephone network, and the PSAP. The

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<sup>3</sup> The JEM Report, and the continuing activities of PCIA and many other mobile industry interests to promote compatibility with E911 systems, belie the Commission's suggestion that "it appears doubtful that enhanced 911 interface capability will be implemented voluntarily." Notice at note 38.

<sup>4</sup> JEM Report, Executive Summary, at 2.

<sup>5</sup> Id.

JEM Report goes a long way toward establishing a workable SRD.

- Second, the industry must translate these performance requirements into hardware design and data transfer standards that will permit the wireless, wireline, and PSAP systems to transmit, receive, and share the relevant information.
- Third, manufacturers must build prototype equipment, which must be field-tested across each of the frequency bands, air interfaces, and system architectures found among commercial mobile services. Finalization of the standards will proceed in parallel with the results of the field tests.
- Fourth, equipment must be deployed commercially.

For some of the elements of compatibility, such as prioritization and call-back capability, these steps likely can be concluded in the relatively near future. Others, such as automatic location identification technology, will take considerably longer. In no case, however, can either the Commission or the industry establish today a deadline that is anything more than arbitrary. Accordingly, any time frames adopted by the Commission should be in the nature of flexible goals, rather than cut-off dates for compliance.

PCIA is confident that the industry, working together with manufacturers and the 911 community, will progress toward compatibility as expeditiously as possible. The most appropriate role for the Commission in this process would be informally to monitor meetings and, if desired, to require periodic submission of formal progress reports. These management tools, far more than the technologically

insupportable performance deadlines proposed in the Notice, will assure that compatibility between wireless services and E911 systems is achieved in a timely, efficient, and cost-effective manner.

In the remainder of these comments, PCIA will address the specific elements of compatibility identified in the Notice. PCIA emphasizes that the repeated references herein to technological hurdles do not arise out of intransigence or opposition to the ultimate goal of compatibility. Rather, they are intended to educate the Commission regarding the substantial work that must still be done, the ill-advised nature of the proposed deadlines, and the preferability of an industry-driven process for achieving the shared objective of the Commission, the 911 community, and the wireless industry -- full compatibility between wireless services and E911 systems.

**II. THE COMMISSION SHOULD ENCOURAGE THE WIRELESS INDUSTRY AND THE EMERGENCY SERVICES COMMUNITY TO CONTINUE TO WORK TOWARDS COMPATIBILITY, RATHER THAN ESTABLISHING ARBITRARY AND INSUPPORTABLE COMPLIANCE DEADLINES.**

A. Scope of the Rules

The FCC proposes to limit the scope of the compatibility requirement to "mobile radio services offering access to real-time voice service provided on the public switched

network."<sup>6</sup> PCIA agrees that "real time voice service" appropriately defines the class of radio services to which the E911 rules should apply. However, specialized mobile radio (SMR) services need to be treated separately because these offerings can allow subscribers the option of choosing whether to be interconnected with the public switched telephone network ("PSTN"). SMR providers should be required to assure compatibility only for options that entail interconnected service. In addition, air-to-ground services should be exempt from the compatibility requirement because of the impossibility of response by terrestrial 911 providers.<sup>7</sup>

B. Availability of E911 to Wireless Service Subscribers

Under the proposed rules, a user would be able to access emergency services from any service-initialized handset in a home service area or a subscribed-to roamed service area by dialing 911 without the requirement for user validation.<sup>8</sup> PCIA generally agrees with this requirement. Mobile service

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<sup>6</sup> Notice at ¶ 38.

<sup>7</sup> The technical challenges associated with providing ALI for wireless multi-line telephone systems are akin to those faced by PCS and cellular providers. Furthermore, additional challenges exist for wireless multi-line systems beyond those addressed in this submission.

<sup>8</sup> Notice at ¶ 41.

providers should be required to provide service only to handsets that have been initialized and whose users maintain a currently valid subscription to a wireless service. Moreover, because the roamed-to system needs to know of the existence of the roaming subscriber, wireless providers should be required to provide E911 access only to subscribed roamers. These limitations are essential to the provision of E911 service because if a mobile device is used by a non-subscriber, the mobile carrier may pass incomplete or inaccurate information to the PSAP.

At the same time, clarification of the proposed availability requirement is warranted in several respects. First, the Commission must recognize that only handsets that are in proper operating condition and in range of a base station should be required to provide access to E911. Consequently, the rules should note that there will be instances when a handset is incapable of communicating, such as phones with broken antennas or dead batteries and phones that are located in a coverage gap in the cell.<sup>9</sup> Second, while it may be feasible to require the dialing of the digits 9-1-1 to override any user lock, retrofitting existing equipment to allow for this feature would not be cost-

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<sup>9</sup> This exemption would also apply to instruments that legitimately have been denied access to the network by the carrier because the instrument is damaging or disrupting the network.

effective and should not be required. Third, access to E911 by wireless subscribers necessarily is contingent upon the presence of a wireline and public safety 911 infrastructure that can process and respond to a 911 call placed from a wireless handset. 911 access to emergency services is not available on many wireline systems today, thereby making it impossible for wireless carriers to offer access to E911 service in those areas. Fourth, the Commission should state that the proposed one-year deadline for availability of 911 access to wireless subscribers is a goal rather than a firm cut-off date. This goal likely is achievable in most areas, but some PSAPs may require a longer period to deploy the equipment or software necessary to support wireless access.

C. Grade of Service

PCIA agrees with the Commission that federal grade of service standards need not be promulgated at this time.<sup>10</sup> PCIA also concurs that any grade of service standards which are promulgated in the future must be the product of a cooperative effort between the initiating, interconnecting, and terminating systems.<sup>11</sup> Wireless, wireline, and emergency service providers share a common goal of minimizing the number of blocked calls, and accordingly, such joint efforts

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<sup>10</sup> Notice at ¶ 42.

<sup>11</sup> Id. at ¶ 43.

can be expected to adequately address the grade of service issue.

D. 911 Call Priority

The proposed rules would require that, within one year after adoption of an Order, originating wireless 911 calls be assigned priority over non-emergency calls, and that this priority be assigned at the handset.<sup>12</sup> Priority would include placing the call at the head of the mobile radio network calling queue, without interrupting calls already in progress.<sup>13</sup> This issue is complicated by the fact that mobile networks currently are incapable of either prioritizing or queuing calls. That is, when a user "sends" a call today, access to the network is determined solely by how busy the network is at that given moment.

Even assuming for the moment that a queuing system were in place, the problem of call prioritization is not trivial. For example, if a member of the general public places a wireless 911 call, and the system wishes to prioritize that

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<sup>12</sup> Id. at ¶ 44.

<sup>13</sup> Call queuing consists of time stamping each call after it is dialed and "sent," accepting all calls, and then connecting each call according to when it was sent, with the first call sent being the first call connected. Prioritization would consist of stamping each call with priority information (e.g. does the caller need emergency services, and what is the nature of the emergency), assigning a priority to each call, and then connecting each call according to its priority rather than its time of queuing.

call (i.e. push it to the head of the queue), other waiting calls will be "downgraded" in priority. Such downgrading would be inappropriate if the downgraded call is of an emergency nature but not made by dialing 9-1-1 (e.g., a call to a suicide hotline or a poison control center).

Similarly, if a member of the emergency service community is seeking to use the wireless network to aid in the provision of emergency services, that rescuer's call will need to be prioritized by some yet to be formulated algorithm. The alternative Priority Access and Channel Assignment (alt. PACA or PACA) protocol represents one such priority scheme for 800 MHz cellular 911 calls.<sup>14</sup> Additional work on this standard is needed, however, and an independent entity needs to administer the assignment of priorities to multiple entities.

Even assuming that call queuing and call priority were both fully implemented, there remains the problem of call flow control (throttling). In the simplest case, numerous mobile customers would simultaneously report an emergency situation (e.g. a freeway collision) via 911. All of these calls would jump to the head of the calling queue, thereby

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<sup>14</sup> Under PACA, three levels of priority are established, designated A, B, and C, from highest to lowest priority, and each 911 call is prioritized. Three channels are reserved for these calls, with A priority calls having access to all three channels, B priority calls having access to two channels, and C priority calls having access to only one channel. JEM Report, at 6-7.



overwhelming both the LEC and the PSAP. In the mean time, 911 calls from, for example, a shooting, stabbing, or fire that occurred five minutes after the freeway collision might be squeezed out. Therefore, simply providing for wireless queuing and prioritization without coordinating these efforts with the LECs and PSAPs might actually create as many problems as it solves.

In short, PCIA concurs that 911 call priority is an important element of wireless access to E911 service. For the foregoing reasons, however, the proposed one year implementation date is unrealistic and counter-productive. Instead, the Commission should urge industry bodies to continue their work on developing a reasonable and effective call prioritization scheme for wireless services.<sup>15</sup>

E. User Location Information

The Commission proposes that within five years of the effective date of an Order in this proceeding, wireless carriers will be required to provide PSAPs with Automatic Location Identification (ALI) capable of placing the caller

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<sup>15</sup> In any event, PCIA urges that any emergency call prioritization rules promulgated by the FCC should immunize the wireless carrier from liability for failing to transmit calls that were bumped in order to facilitate completion of the prioritized call.

within a 125 meter sphere.<sup>16</sup> Implementation of this feature would occur in three stages, as described below.<sup>17</sup>

PCIA fully agrees with the ultimate objective of providing ALI to the PSAP. Such information can serve two important functions: routing the call to the appropriate PSAP and aiding the rescuers in locating the caller. Nonetheless, for the reasons discussed below, PCIA believes the approach to ALI set forth in the Notice is both unworkable and imprudent.

1. Stage 1

As a first stage in the provision of ALI, the Commission proposes that within one year after adoption of an Order, wireless providers be capable of determining the location of the base station or cell site receiving the 911 call, and relaying that information to the PSAP nearest that base station.<sup>18</sup> PCIA harbors serious doubts about the merits of this approach because the information provided often will not facilitate routing to the nearest PSAP and may actually impede a timely response.

Cell sites can cover areas of several square miles, making it impossible to localize the point of origination of

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<sup>16</sup> Notice at ¶ 51.

<sup>17</sup> Id. at ¶ 49.

<sup>18</sup> Id. at ¶ 49.

a call. Moreover, because radio cell boundaries and PSAP service area boundaries do not necessarily coincide, calls might be routed to a geographically inappropriate PSAP if the routing is done based solely on originating cell site location. And, in many cases, the originating cell site will not be the one closest to the caller. For example, if a caller is driving through a call-congested area, the 911 call might be handed off to a geographically remote base station. Similarly, interference or terrain may cause a call to be handled by a distant cell site. In either event, if base station location is used to route the call to a PSAP, the wrong PSAP might be contacted.<sup>19</sup>

Moreover, under current technology, the transmission of base station information requires the use of pseudo ANI.<sup>20</sup> The use of pseudo ANI, however, precludes the passage of the originating telephone number, which is essential to permit call-back by the PSAP operator. In most cases, it seems evident that the originating telephone number would be far more useful to emergency service personnel than the

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<sup>19</sup> Accordingly, if the Commission adopts a requirement to provide originating base station information, it is essential that the PSAP operator continue to be required to ask a mobile caller for his or her location, and that this location data, rather than the base station information, serve as the PSAP's primary routing information.

<sup>20</sup> Pseudo ANI is a non-dialable number that is assigned to a base station or a particular sector of a base station. That number is then transmitted to the PSAP instead of the caller's ANI.

originating base station information. Yet, the likely effect of the proposed one year deadline would be to freeze current technology and preclude achievement of the Commission's goal of enabling call-back. The industry should work for a solution that supports transfer of ANI (for call back) and pseudo ANI (for routing and data base query). Progressing beyond current pseudo ANI probably is not achievable within the proposed one-year deadline.

## 2. Stage 2

As a second stage in the provision of ALI, within three years of the effective date of an Order, wireless providers would be required to provide PSAPs with an estimate of the approximate distance and direction of the caller from the base station or cell site.<sup>21</sup> PCIA respectfully suggests that the Stage 2 proposal is neither readily achievable, desirable, nor a significant step toward the ultimate goal of compatibility. Based on the results of the two JEMs, it is highly unlikely that technology and standards could be developed within three years that would produce information that is even remotely accurate. Quite to the contrary, such base station distance and direction technology might represent a costly technological dead end, while the research and development dollars expended to develop this technology

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<sup>21</sup> Notice at ¶ 50.

could have been better expended on developing Stage 3 capabilities. Therefore, PCIA requests that the Stage 2 requirements be eliminated.

### 3. Stage 3

As a third stage in the provision of ALI, within five years of the effective date of an Order, wireless providers would be required to provide PSAPs with an estimate of a caller's location within a 125 meter sphere.<sup>22</sup> PCIA respectfully submits that this proposal is entirely inconsistent with the current state of technology. Rather than tying the implementation of Stage 3 technologies to the effective date of an Order, the Commission should encourage continuation of a four-step process, which is already underway, that will lead to the development of viable ALI technology by industry bodies (with Commission oversight through informal monitoring and periodic progress reports).

First, a Standards Requirement Document (SRD) should be developed in order to define performance standards for the wireless system, the wireline network, and the PSAP. The JEM Report and the Joint Position Paper represent an industry consensus and as such are good starting points for the final SRD.

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<sup>22</sup> Id. at ¶ 51.

Second, standards for equipment design, data transfer, and interworking and interoperability must be developed for PSAPs, wireline and wireless networks, signaling systems, and PCS technologies. Because developing such standards will require the cooperation of all affected entities, the industry should assemble a joint emergency services coordinating body to oversee the creation of detailed system requirement documents. The C.J. Driscoll and Associates Survey (Driscoll Survey)<sup>23</sup> is a helpful step toward the promulgation of design standards for location technologies. However, none of the technologies in the Driscoll Survey is in use in a CMRS system today, and no manufacturers of radio equipment have reported to the Joint Technical Committee on Wireless Access that they intend to integrate any of these technologies into their 1800 MHz PCS handsets. In addition, the Driscoll Survey did not independently verify the performance claims made by the manufacturers of the products which were described in the report.

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<sup>23</sup> "Survey of Location Technologies To Support Mobile 911."

Because 2 GHz PCS,<sup>24</sup> 800-900 MHz mobile communication services,<sup>25</sup> and other emerging technologies<sup>26</sup> consist of broad families of technologies, the ability of a specific air interface to provide location information must be determined with respect to numerous possible implementations. Further, any proposed radio location technology must be evaluated for operation with not only current and future 800 and 900 MHz technologies, but also with each of the seven emerging JTC Common Air Interface standards.<sup>27</sup> Within each of these CAI standards, there are multiple methods of implementation depending upon the environment in which the technology is used. For example, systems may be implemented through macrocells,<sup>28</sup> microcells,<sup>29</sup> picocells,<sup>30</sup> cable TV, repeaters, cell enhancers, distributed antennas, sectored/omni

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<sup>24</sup> 2 GHz PCS consists of the following technologies: Composite CDMA/TDMA, Upbanded IS-95, PACS, Upbanded IS-54, PCS1900, DCTU, and 5 MHz CDMA.

<sup>25</sup> 800-900 MHz technologies include: AMPS, N-AMPS, IS-54 US Digital Cellular, IS-95 US Digital Cellular, E-TDMA, InterDigital Broadband CDMA Overlay, Motorola MIRS ESMR, Geotek Frequency Hopping Multiple Access, and other ESMR/SMR technologies.

<sup>26</sup> Other technologies include N-AMPS on 2 GHz, and any new technologies.

<sup>27</sup> Composite CDMA/TDMA, Upbanded IS-95, PACS, Upbanded IS-54, PCS1900, DCTU, and 5 MHz CDMA.

<sup>28</sup> From 2 to 25 mile radius cells.

<sup>29</sup> From 300 foot to 1 mile radius cells.

<sup>30</sup> Under 500 foot radius cells.

configurations, and three-dimensional cell structures. Thus, systems employing a single electromagnetic frequency may consist of layers of different implementation technologies, depending upon whether the operator is serving rural Kansas, downtown Manhattan, the Chesapeake Bay, or an interstate highway. An added complication is the fact that location technologies must support all roaming handsets using a compatible air interface. Finally, the systemic impact of high speed handoffs through multiple cell sites, base stations, and neighboring systems must be taken into account.

Third, once design standards are developed, prototype devices must be manufactured and field-tested. This field testing should include an assessment of the accuracy and repeatability of signal reception in various urban and rural environments, the accuracy of reception using only a single cell (due to system layout or link budget), the effect of repeaters/enhancers on position determination (i.e., is the enhancer or the mobile customer being located), and the effect of reflections in an urban environment with non line-of-sight propagation (i.e., is the reflection or the mobile customer being located). During and after field testing, design standards will need to be revised. Only after the conclusion of the testing process will it be possible to determine whether the ability to locate a user within a 125



meter sphere, as called for by the Notice, is reasonably achievable.

Fourth, the technology must be implemented. In implementing a technology, distinctions must be drawn between integrated technologies and overlay technologies. Integrated technologies use the radio system infrastructure, including antennas, towers, receiver subsystem, interconnection system, and switching system to send and receive location information. If the location system is integrated, then the activities of the manufacturers of each of the aforementioned pieces of equipment must be coordinated. Overlay technologies, on the other hand, use a non-radio system infrastructure, and when implementing such technologies, the interconnections with each of the aforementioned system components must be coordinated.<sup>31</sup> Additional complications include systems which employ power control, potentially limiting reception to a single cell site, and systems which employ ultra high gain antennas (20+ dB gain) plus diversity to achieve link budgets. In such systems, the location technology must work within the single cell site or link budget limitations.

Plainly, it will take more than the five years envisioned by the Commission to define performance standards,

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<sup>31</sup> A related issue is that of how well overlay technologies respond to high speed handoffs.